Docket No.: 1752-0179PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Shinji MATSUO et al.

Application No.: 10/566,725 | Confirmation No.: N/A

Filed: February 2, 2006 | Art Unit: N/A

For: ALUMINUM CHELATE COMPLEX FOR ORGANIC EL MATERIAL | Examiner: Not Yet Assigned

LETTER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Subsequent to the filing of the above-identified application on February 2, 2006, attached hereto is an English translation of the International Preliminary Report on Patentability (Form PCT/IPEA/409) that should be made of record in the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or to credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Dated: July 13, 2006

Respectfully submitted,

By
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PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF TRANSMITTAL
OF COPIES OF TRANSLATION
OF THE INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY
(CHAPTER I OR CHAPTER II
OF THE PATENT COOPERATION TREATY)
(PCT Rules 44*bis*.3(c) and 72.2)

To:

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JAPON

Date of mailing *(day/month/year)* 13 April 2006 (13.04.2006)	
Applicant's or agent's file reference NTK04-1629WO	**IMPORTANT NOTIFICATION**
International application No. PCT/JP2004/011334	International filing date *(day/month/year)* 06 August 2004 (06.08.2004)
Applicant NIPPON STEEL CHEMICAL CO., LTD. et al	

1. **Transmittal of the translation to the applicant.**

☐ The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).

☑ The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

2. **Transmittal of the copy of the translation to the designated or elected Offices.**

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

EP, KR

The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

AE, AG, AL, AM, AP, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EA, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

3. **Reminder regarding translation into (one of) the official language(s) of the elected Office(s).**

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Yoshiko Kuwahara
Facsimile No.+41 22 740 14 35	Facsimile No.+41 22 338 90 90

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Form PCT/IPEA/416
NTK04-1629WO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/JP2004/011334	06.08.2004	07.08.2003

International Patent Classification (IPC) or national classification and IPC

C07D215/30, C09K11/06, H05B33/14 // C07C37/64, 39/14

Applicant

NIPPON STEEL CHEMICAL CO., LTD.

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 4 sheets, as follows:

      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))

      _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/JP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/JP2004/011334

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (Rule 12.3 and 23.1(b))

☐ publication of the international application (Rule 12.4)

☐ international preliminary examination (Rule 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1-50 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

nos. 4,6-9 as originally filed/furnished

nos.* _____ as amended (together with any statement) under Article 19

nos.* 1-3,5 received by this Authority on 22.06.2005

nos.* _____ received by this Authority on _____

☒ the drawings:

sheets fig. 1 as originally filed/furnished

sheets* _____ received by this Authority on _____

sheets* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/JP2004/011334

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-9	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-9	NO
Industrial applicability (IA)	Claims	1-9	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Citations

Document 1: JP 05-214332 A (Eastman Kodak Co.), 24 August 1993

Document 2: JP 05-198378 A (Eastman Kodak Co.), 06 August 1993

Document 3: JP 06-172751 A (Eastman Kodak Co.), 21 June 1994

Document 4: JP 2003-142264 A (Pioneer Electronic Corp.), 16 May 2003

Explanations

Claims 1 to 9

The inventions set forth in claims 1 to 9 are not disclosed in any of the documents that are cited in the international search report; therefore, said inventions are novel. However, the inventions in question do not involve an inventive step in the light of documents 1 to 4 cited in the international search report.

Documents 1 to 3 disclose aluminum complexes represented by general formula (1) set forth in claim 1 wherein $O\text{-}Ar_1\text{-}Ar_2$ is a phenolate ligand, and indicate

that the aluminum complexes in question are light emitting materials for use in organic EL devices. Therein, documents 1 to 3 further indicate that it is preferable for said phenolate ligands to be derived from various phenols that include a hydroxynaphthalene, and for said phenolate ligands to have a total of 7 to 18 carbon atoms (for example, refer to document 1, paragraph [0019]); indicate that it is acceptable for aromatic hydrocarbon groups such as phenyl rings or naphthyl rings to be substituted in as substituent groups, and that the phenyl substituent groups and the like have been observed to produce highly desirable organic EL device characteristics (for example, refer to document 1, paragraph [0021]); and disclose a sublimated powder of an aluminum complex wherein the abovementioned phenolate ligand is an o-, m- or p- phenylphenolate, said sublimated powder having been refined by means of sublimation.

Meanwhile, document 4 discloses an organic EL element in which a light emitting layer that comprises an organic host material (e.g. an aluminum complex or the like) and a phosphorescent organic guest material is disposed between the anode and the cathode. Therein, document 4 presents 2, 3, 7, 8, 12, 13, 17, 18-octaethyl-21H, 23H-porphine platinum (II) and tris (2-phenylpyridine) iridium, etc., as examples of the phosphorescent organic guest material, and further presents an organic EL element with a light emitting layer wherein the ((1, 1'-biphenyl)-4-olato) bis(2-methyl-8-quinolinolate) aluminum that serves as the organic host material and the 2, 3, 7, 8, 12, 13, 17, 18-octaethyl-21H, 23H-porphine platinum (II) or other such

red phosphorescent material that serves as the organic material are co-evaporated from different evaporation sources (examples 1 to 3).

Consequently, it would have been easy for a person skilled in the art to conceive of employing various phenolate ligands, including phenyl group-substituted naphthlates, as the phenolate ligands in the aluminum complexes that are disclosed in documents 1 to 3, and delimiting an upper limit for the content of impurities and eliminating the impurities via the application of a well-known refinement method such as recrystallization in order to improve the device characteristics and the stability of the complexes in question. In addition, it would also have been easy for a person skilled in the art to conceive of employing an aluminum complex that has been obtained in such a manner as the organic host material in the organic EL element that is disclosed in document 4, as appropriate.

Furthermore, an investigation of the disclosures in the description of the present application revealed that the present application does not include comparisons between complexes that comprise the phenolate ligands that are set forth in claim 1 and complexes that comprise the o-, m-, or p- phenylphenolate ligands or the other phenolate ligands that are specifically disclosed in documents 1 to 3, and thus the inventions that are set forth in claims 1 to 9 cannot be considered to exhibit a significant effect that could not have been predicted in the light of the inventions disclosed in documents 1 to 4.

Moreover, in the pertinent technical fields it is well known that impurities which comprise compounds with

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

halogen atoms will cause a reduction in the photoluminance and the light emission lifetime of the organic EL element due to the fact that the compound with a halogen atom acts as a trap for the electron holes or the electrons that are transported from each electrode (if necessary, refer to the document WO 2000/41443 A1, page 40, lines 1 to 10).